REPORTS

ON THE

Shepherd Copper Mine

SITUATED IN

SOUTH STUKELY,

CANADA EAST.

REPORTS BY CHARLES ROBB, MINING ENGINEER.

Montreal:
PRINTED BY JOHN LOVELL, ST. NICHOLAS STREET.
1864.

THE SHEPHERD COPPER MINE.

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THIS location is situated on Lot 7, Range 2, South Stukely, Eastern Townships, Canada East, containing 95 acres, title free-hold, free from any royalty or charge. (See plan.)

Sir WILLIAM LOGAN, in the condensation of his reports to the Canadian Legislature, entitled the "Geology of Canada," has pointed out the mineral resources of Canada. (See Report.) His position in the scientific world, and his contributions to the Industrial Exhibitions of England and France, have satisfactorily proved the richness of Canada in deposits of iron, copper, lead, slate, mineral manures, and mineral oils. Thus he has opened a new and rich field to the miner, which bids fair to rival all others, and has forged a new link to bind Britain to Canada by the interests of the arts and commerce. A beginning has been made in the opening of the Copper Mines of the "Huron Copper Bay," in Western Canada, and the "Acton," the "Harvey Hill," and the "Ascot," in Eastern Canada. These enterprises may be said to be yet in their earliest stages of development, still they have proved satisfactory, and hold out the most brilliant prospects for the future.

The Lake Superior region in Western Canada, although rich in minerals, is distant from the point of supply and shipment, and labors under the disadvantage of being in an unsettled and barren district.

The Eastern Townships section, on the contrary, is in a thickly settled rich agricultural country, resting on the valley of the St. Lawrence, traversed by rivers, roads, and railways, and having a means of easy supply or shipment through Montreal, Quebec, Portland, or New York. The climate is healthy, labor and provisions cheap, taxation nominal, and the law supreme.

The frost of the four winter months affords further facility in mining operations, preventing the annoyance of surface water. Under such circumstances the "Shepherd Copper Mine" is favorably situated on the immediate line of the Shefford and Stanstead Railway, in the village of "Stukely Mills." The nature and value of the veins of copper are stated in the reports of Charles Robb, Esquire, a mining engineer, of ability and integrity. In order that every point may be made satisfactory, reference is made to Sir William Logan, and to Thomas C. Keefer, Civil Engineer, both of whom are well known in England, and who can testify as to Mr. Robb's position.

The development of this location, so far as attempted, has been the sinking of test pits the entire length of the lot, and of one shaft of about twenty feet. These have proved the nature and extent of the vein. It is now proposed, as the circumstances justify it, to fully work this location in an ample and careful manner.

The property has substantial stone and wooden buildings suitable for a resident manager and workmen; and it will be sufficiently explanatory to state that any one living there would find himself as comfortably located as to church, school, and comfort, as if he were in an English village.

Reference is therefore made to the accompanying plans and reports, and further information may be obtained from the proprietor,

WM. B. LAMBE,
Advocate, Montreal.

Montreal, July, 1864.

REPORT

ON THE

SHEPHERD COPPER MINE

IN

STUKELY, CANADA EAST.

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53 St. Francois Xavier Street,
Montreal, 16th December, 1863.

W. B. Lambe, Esq.

Dear Sir,—Having had frequent opportunities of visiting and inspecting the copper mining location (No. 7 in the 2nd range of Stukely) on the land of Jacob Shepherd, and which has been recently acquired by you, and having been requested by you to state such facts regarding it as may have come under my observation, I beg now to hand you the following Report, together with a sketch shewing the locality and position of the property and of the mineral veins thereon. I also enclose a small map shewing its position with respect to the railways and ports of shipment. As regards its geological position and mineralogical character, this mine is most favorably situated. It lies on the line of the most important band or system of bands of copper-bearing slates hitherto discovered in Canada, and which in the neighboring townships of Bolton, Brome, and Sutton, as well as in Stukely and Melbourne, has produced many very promising copper mines. The rock is micaceous and chloritic slate of a dark green color (from the presence of chlorite), and is interstratified with bands of a lighter colored slate and of dolomitic limestone, which are supposed by Sir

William Logan to occupy the same stratographical position as the copper-bearing dolomite of Acton.

The copper ores occur disseminated throughout the chloritic slates chiefly at or near the junction between the bands of different colors and between the slate and limestone. Veins of quartz, calcspar, and chlorite traverse the slate rocks irregularly; and where these occur they are usually marked by the presence of vitreous, variegated and pyritous sulphurets of copper in considerable masses. Such is the general character of this cupriferous region.

On the property in question, the ores of copper are found both in the slates and in the limestone, two bands of which are traceable throughout the entire length of the lot at the distance of about 40 rods apar tacross the strike, which is N. 35° E., the dip being to the N.W. at an angle of about 55°. Both bands of limestone are highly cupriferous; that to the northwest, which is about 15 feet thick, constituting a vein of yellow copper ore of such productiveness as to give excellent promise of a paying mine. Openings have been made by blasting in this limestone band in several places, and have not only proved the extent of the vein as before specified, but its productiveness and value to improve rapidly in sinking on it. A shaft has been sunk at one place to the depth of 21 feet on the foot wall of the vein or junction between the limestone and the slate, and the results of working here are highly encouraging, shewing a rapid increase in the quantity of copper, and on the whole a much greater production of ore than I have seen anywhere else in the Eastern townships with such a small expenditure of labor. Here the ore is mostly the yellow sulphuret, which is well known to be the most persistent and reliable, as well as the most valuable for its fluxing qualities. Near the surface the rock is highly siliceous, and the copper ore was much mixed with iron pyrites, large solid blocks of which, containing (by my assay) from five to ten per cent. of metallic copper, were obtained in abundance, but on sinking to the moderate depth named, the rock became softer and more free from quartz; the iron was observed rapidly to diminish in quantity, and to give place to copper ore, the amount of which now in sight would probably be sufficient to pay for stoping, while there can be no doubt that on sinking a little further, this amount will continue to increase. Besides

the copper ore distributed throughout the mass of this limestone, a vein of contact, twelve to eighteen inches in thickness between the slate and limestone is cut by this shaft. This vein produces large pieces or prills of solid copper ore, associated with magnetic iron pyrites, which in these rocks is universally considered a favorable indication for copper mining.

The other dolomitic band, forty rods to the east, is also cupriferous, and although not yet explored, there is reason to believe that it will prove, at least, equally important with the former. It is penetrated in many places by a rock which seems to be analogous to the greenstone of Acton, which is by many regarded as an intrusive rock, and at Acton Mine is invariably accompanied by rich deposits of copper at the junction between it and the limestone and slate. There is reason to believe that both bands of limestone are connected, and that the intervening slate overlies in a trough of the limestone, in which case there will be an immense and rich deposit of copper ore throughout this width, and extending the whole length of the lot, at the junction of the two rocks. In addition to the rich display of yellow ore developed in the limestone, vitreous copper ore has been found in certain bands of the slate rock traversing this property. Little work has as yet been done to prove the quality of these cupriferous belts ; but judging from the experience obtained in sinking on similar veins in other parts of the same rock formation, there is every reason to believe that these will prove productive and profitable. I have the authority of Dr. R. P. Stevens, of New York, a very competent mining geologist, who has visited this property, for stating that the same band of silicious limestone which traverses this property has been traced at various and distant points all the way to Virginia, and had produced good mines of copper, lead, and iron. Dr. S. was remarkably well pleased with the indications on your property. My opinion is, that there is less of a speculative and uncertain character about this mine than any other that I have yet inspected in Canada, and that with prudent and economical management, it cannot fail to pay, and even to yield returns almost from the commencement of working. There is undoubtedly ample encouragement to proceed to more extensive operations with a view to its further development. This mining location is situated in a well-settled county, having abundant accom-

modation for the men who may be employed in mining. The Stanstead, Shefford, and Chambly Railway will pass through the adjoining lot, and connects with railroads to Boston, New York, &c. This road also affords in summer a means of cheap water transportation via St. Johns on the River Richelieu, with the same ports as well as with Montreal and Quebec, via the St. Lawrence.

I am, dear Sir,

Yours very respectfully,

CHARLES ROBB.

(Copy.)

53 St. Francois Xavier Street,

Montreal, 15th February, 1864.

Wm. B. Lambe, Esq.

Dear Sir,—Referring to my Report on the Shepherd Mining location, dated 16th December last, I therein expressed my conviction that the mine would pay for working, even should no such improvement as we are warranted in expecting take place. As you have requested me to state explicitly and in detail the grounds on which this opinion has been formed, I have made an estimate of the costs and profits of working, which I have been careful in all the items to keep on the safe side. In this estimate, which is made upon a specie basis, I shall take into account only the one band or vein of cupriferous limestone which has been already proved (although I believe that there are other and probably richer deposits on the location), the peculiar value of which consists in the breadth of rock impregnated with the ore, and in the proximity to a railroad station, to which the marketable ore could be conveyed on a short tramway with a downward incline, and consequently the cost of shipping will be almost nominal. The thickness of the copper-bearing limestone band will be about 12 feet, and I estimate its average copper contents to be two (2) per cent. throughout the mass; of which, however, I shall assume that one-half will be dead rock, to be thrown aside or left on the stalls. In the process of dressing, the copper contents will be reduced one-fourth, or say

to 1½ %. Supposing it to be dressed up to 12 % for the market, one cubic fathom of rock will weigh sixteen tons; and the probable cost of raising—including draining and drawing the ore to dressing floors, and a due proportion of the cost of shafts, drifts and exploratory works—will not exceed $32 per fathom.

PROCEEDS OF ONE FATHOM.

16 tons of 1½ % ore = 2 tons of 12 % ore @ $4 ℔ unit..		$96 00
Deduct difference dry and humid assay, ½ % on 2 tons of 12 %.....		4 00
Value of one fathom of rock, mined.....		$92 00

EXPENSES OF ONE FATHOM.

Mining, raising, and drawing to dressing floors..	$32 00	
Dressing 8 tons rough ore, at $1.25.....	10 00	
Separating dead rock, 16 tons, at 25c.....	4 00	
Barrels and packing 2 tons, at $1.50.....	3 00	
Freight to New York (water from St. Johns), at $5,	10 00	
Management and contingencies, 16 tons, at 25c..	4 00	
		63 00
		$29 00

N.B.—At Acton mine, the cost of searching for ore, mining, and bringing to surface is only $8.50 ℔ ton of 12 %, and that of dressing only $1.15 ℔ ton of rough ore.

Supposing 5 fathoms or 80 tons per day to be mined, and allowing 300 working days to the year, this would give (5 × 29 × 300) = annual profits		$43,500 00
Less interest on capital invested, say $50,000, @ 7 %..	$3,500 00	
Insurance, wear and tear, &c., &c.....	1,500 00	
Agencies, discounts, travelling expenses, &c., &c., &c.....	800 00	
		5,800 00
Net annual profits.....		$37,700 00
Dividend on paid-up capital, say of $150,000, @ 25 %,		37,500 00
Surplus carried to each year.....		$200 00

Having recently had the pleasure of travelling in company with Professor Chase of Providence, Rhode Island, who is considered the best scientific authority, in mining matters, in the United States, I showed him the above estimate, and described faithfully the features of the place, and he expressed himself fully satisfied with the correctness of the figures and with the great value of the mine. Trusting that the above will be sufficiently explicit,

I remain, dear sir, yours very faithfully,

CHARLES ROBB, *Mining Engineer.*